



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

October 6, 2009

Mr. Larry Meyer
Site Vice President
FPL Energy Point Beach, LLC
6610 Nuclear Road
Two Rivers, WI 54241

SUBJECT: POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2 – ALLOY 600 PROGRAM
LICENSE RENEWAL COMMITMENT SUBMITTAL (TAC NOS. MD9958 AND
MD9959)

Dear Mr. Meyer:

By the letter dated October 6, 2008 (Agencywide Documents Access and Management System Accession No. ML082810445), FPL Energy Point Beach LLC (the licensee), submitted its response to a commitment by Nuclear Management Company, LLC, the former licensee, to support the renewal of the operating license for Point Beach Nuclear Plant Units 1 and 2. Specifically, the former licensee committed to implement an Alloy 600 Inspection Program as part of the license renewal process. Additionally, the former licensee committed to submit a Reactor Coolant System Alloy 600 Inspection Program 24 to 36 months prior to the period of extended operation for U.S. Nuclear Regulatory Commission (NRC) review and approval.

The NRC staff, in accordance with Title 10 of the *Code of Federal Regulations*, Section 54.21(a)(3), has reviewed the licensee's Reactor Coolant System Alloy 600 Inspection Program to ensure that the effects of aging will be adequately managed so that the intended functions will be maintained consistent with the current licensing basis for the period of extended operation. The enclosed safety evaluation documents the NRC staff's findings.

If you have any questions, please contact me at 301-415-2048.

Sincerely,

A handwritten signature in black ink, appearing to read "JP", written over a white background.

Justin C. Poole, Project Manager
Plant Licensing Branch III-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-266 and 50-301

Enclosure:
Safety Evaluation

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO ALLOY 600 PROGRAM LICENSE

RENEWAL COMMITMENT SUBMITTAL

FPL ENERGY POINT BEACH, LLC

POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

DOCKET NOS. 50-266 AND 50-301

1.0 INTRODUCTION

By letter dated October 6, 2008 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML082810445), FPL Energy Point Beach, LLC, the licensee, submitted its response to a commitment by Nuclear Management Company, LLC, the former licensee, to support the renewal of the operating license for Point Beach Nuclear Plant Units 1 and 2. Specifically, the former licensee committed to implement an Alloy 600 Inspection Program as part of the license renewal process. Additionally, the former licensee committed to submit a Reactor Coolant System Alloy 600 Inspection Program 24-36 months prior to the period of extended operation for U.S. Nuclear Regulatory Commission (NRC) review and approval.

2.0 REGULATORY EVALUATION

The NRC staff reviewed the Point Beach license renewal application for compliance with the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR), Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants." In December 2005 (ADAMS Accession Nos. ML053420134 and ML053420137), the report "Safety Evaluation Report Related to the License Renewal of the Point Beach Nuclear Plant, Units 1 and 2" was issued as NUREG-1839.

In accordance with 10 CFR 54.21(a)(3), "For each structure and component identified in paragraph (a)(1) of this section, demonstrate that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the [current licensing basis] CLB for the period of extended operation."

As documented in NUREG-1839, the NRC staff reviewed the information included in the License Renewal Application regarding the applicant's demonstration of the Reactor Coolant Alloy 600 Inspection System to ensure that the effects of aging will be adequately managed so that the intended functions will be maintained consistent with the CLB throughout the period of extended operation.

Under the review of the Scope of the Program, the NRC staff's review identified an area in which additional information was necessary to complete the review of the applicant's program elements. By letter dated November 17, 2004 (ADAMS Accession No. ML043270647), NRC staff requested the applicant to provide a commitment to assure that interim report "[Pressurized Water Reactor] PWR Materials Reliability Project Interim Alloy 600 Safety Assessment for US PWR Plants (MRP-44), Appendix 1: Alloy 82/182 Pipe Butt Welds," and its final version will be used as part of the basis for the Reactor Coolant System Alloy 600 Inspection Program. The NRC staff noted that the commitment should state that the Reactor Coolant System Alloy 600 Inspection Program will be submitted 24 to 36 months prior to the period of extended operation for NRC staff review and approval to determine if the program demonstrates the ability to manage the effects of aging pursuant to 10 CFR 54.21(a)(3).

In a response dated January 25, 2005 (ADAMS Accession No. ML050340198), the licensee committed to use the interim report "PWR Materials Reliability Project Interim Alloy 600 Safety Assessment for US PWR Plant (MRP-44), Appendix 1: Alloy 82/182 Pipe Butt Welds," and its final version as part of the basis for the Reactor Coolant System Alloy 600 Inspection Program. The licensee further committed to submit the Reactor Coolant System Alloy 600 Inspection Program to the NRC for staff review and approval 24 to 36 months prior to the period of extended operation. On the basis of the NRC staff's review and the licensee response discussed above, the NRC staff confirmed that the "scope of the program" program element satisfied the criterion defined in the GALL Report and Standard Review Plan for License Renewal (SRP LR) Section A.1.2.3.1. As documented in NUREG-1839, the NRC staff concluded that this program attribute was acceptable.

By letter dated October 6, 2008, the licensee submitted a response to the above commitments by Nuclear Management Company, LLC, the former licensee, providing the details of meeting this commitment for Point Beach Nuclear Plant (PBNP), Units 1 and 2 Alloy 600 Inspection Program as part of the license renewal process.

3.0 LICENSEE RESPONSE

By letter dated October 6, 2008, the licensee provided to the NRC, Procedure AM 3-31, "Alloy 600 Management Program," dated October 2, 2008. The licensee stated that this document describes the overall programmatic requirements that PBNP will follow for the development, control, and implementation of an Alloy 600 Management Program for PBNP, Units 1 and 2.

Further, the licensee stated that this document also implements a commitment to the NRC to manage the effects of aging for components within the scope of License Renewal (LR) as described in NP 7.7.25, PBNP Renewed License Program. The program is focused on both pressure and non-pressure boundary Reactor Coolant System components constructed of Alloy 600 and welds constructed of the associated Alloy 82/182 filler metals. Industry experience has shown these materials to be susceptible to failure by primary water stress-corrosion cracking (PWSCC). Steam generator tubing is excluded from this program because it is covered under the Steam Generator Integrity Program.

The licensee noted that this program was developed utilizing the Electric Power Research Institute (EPRI) MRP-126 "Generic Guidance for Alloy 600 Management" industry guidance document (the finalized version of MRP-44), and Nuclear Energy Institute (NEI) 03-08 "Guideline for the Management of Materials Issues." In addition, the licensee explained that the Alloy 600 Management Program is a living document and will be revised periodically to reflect the latest plant configurations.

4.0 NRC STAFF EVALUATION

The plant-specific Alloy 600 Program manages cracking due to PWSCC for nickel alloy component locations. The overall goal of the program is to maintain plant safety and minimize the impact of PWSCC on plant availability through assessment, inspection, mitigation, and repair or replacement of susceptible components. The NRC staff has verified that the licensee's program is based on EPRI MRP-126, "Generic Guidance for Alloy 600 Management." The NRC staff also agrees that EPRI MRP-126 is not intended to address Alloy 600 in steam generator tubing; the industry has a separate program for this issue, EPRI's Steam Generator Management Program, for which the licensee's program was reviewed and approved during the LR process.

In accordance with 10 CFR 54.21(a)(3), the NRC staff reviewed the information in the licensee's Alloy 600 Program to ensure that the effects of aging will be adequately managed so that the intended function(s) will be maintained consistent with the current licensing basis for the period of extended operation.

The SRP LR, NUREG-1800, Rev. 1, contains the NRC staff's generic evaluation of existing plant programs and documents the technical basis for determining where existing programs are adequate without modification for the extended period of operation. Guidance for the aging management of nickel-alloy material components, of which Alloy 600 components fall within, is provided in Section A.1 "Aging Management Review," of the SRP LR. The NRC staff reviewed the licensee's Alloy 600 Program against the aging management program elements found in Section A.1.2.3 based on the licensee's submittal.

(1) Scope of the Program – Section 4.2 of the licensee's Alloy 600 Program will manage cracking due to PWSCC for the following nickel alloy component locations:

- Reactor Pressure Vessel Shells
- Reactor Vessel Internals
- Reactor Vessel Heads
- Steam Generators
- Pressurizers
- Reactor Coolant Pumps
- Reactor Coolant Piping

Additionally, in Appendix C of the Alloy 600 Program, the licensee provides specific details for each Alloy 600 component, including description, PWSCC susceptibility, inspections, mitigation options, repair options and future plans.

The NRC staff notes that these nickel alloy components are managed under several other programs such as 10 CFR 50.55a which specifies Section XI requirements of the American Society of Mechanical Engineers, Boiler and Pressure Vessel (ASME) Code, license renewal programs such as LR-AMP-005-BAC, Boric Acid Corrosion Program, and several industry issue programs including MRP-139, "Primary System Piping Butt Weld Inspection and Evaluation Guideline." Components addressed in these programs are, appropriately included in the licensee's program scope of the Alloy 600 Program.

The NRC staff confirms that the "scope of the program" program element satisfies the criterion defined in SRP LR Section A.1.2.3.1. The NRC staff finds this program element acceptable.

(2) Preventive Actions - The NRC staff found that the preventive actions usable under the licensee's Alloy 600 Program are inspection, repair/replacement and mitigation. Inspection uses nondestructive and visual examination methods to monitor the aging of the nickel alloy components as required by the licensee's inservice inspection (ISI) program and as augmented by the recommendations of applicable bulletins, generic letters, and NRC-approved industry guidance. In this manner, it is a condition or performance monitoring program, and in accordance with SRP LR Section A.1.2.3.2 no additional review is required.

The licensee notes in Section 4.4 of the Alloy 600 Program several repair alternatives that address preventative actions against PWSCC aging effects of nickel-based alloys. Specifically, the NRC staff notes that the reactor pressure vessel heads have been replaced with PWSCC resistant materials. The NRC staff finds this action demonstrates a proactive approach to preventive actions in addressing the aging effects of nickel-based alloys.

Additionally, some mitigation techniques are currently available for use to address nickel alloy components, and numerous more options are being explored to address the mitigation of active degradation mechanisms for these components. The licensee has noted several mitigation methods under Section 4.5 of the Alloy 600 Program. The NRC staff finds the licensee's program demonstrates effective consideration of various mitigation techniques available.

Based on this review, the NRC staff confirms that the "preventive actions" program element satisfies the guidance in SRP LR Section A.1.2.3.2. The NRC staff finds this program element acceptable.

(3) Parameters Monitored or Inspected – The licensee's Alloy 600 Program detects degradation by using the examination and inspection requirements of ASME Section XI or to accepted industry guidelines. The parameters monitored are the presence and extent of cracking.

For condition monitoring programs, SRP LR Section A.1.2.3.3 states:

"The parameters to be monitored or inspected should be identified and linked to the degradation of the particular structure and component intended function(s)," and "[f]or a condition monitoring program, the parameter monitored or inspected should detect the presence and extent of aging effects. Some examples are measurements of wall thickness and detection and sizing of cracks."

The NRC staff notes that the licensee's Alloy 600 Program uses the appropriate volumetric, surface and visual nondestructive examination techniques for detection of degradation of the components identified in the scope of the program as required by ASME Code and industry guidance.

Based on this review, the NRC staff confirms that the "parameters monitored or inspected" program element satisfies the guidance in SRP LR Section A.1.2.3.3. The NRC staff finds this program element acceptable.

(4) Detection of Aging Effects - The licensee's Alloy 600 Program uses the ASME Code Section XI inspection requirements for ISI and NRC staff accepted industry guidance. The NRC has approved, in accordance with 10 CFR 50.55a, the specific techniques and frequencies for monitoring nickel alloy components, which are prescribed by ASME Code Section XI for those components examined in accordance with the ISI program. In addition, for other items included in the scope of the licensee's Alloy 600 Program, the methods and frequencies of examination are recommended in industry guidance. Each of these programs for the detection of aging effects has been analyzed by the NRC to provide adequate detection capability.

Based on this review, the NRC staff confirms that the licensee's commitment in the "detection of aging effects" program element satisfies the guidance in SRP LR Section A.1.2.3.4. The NRC staff finds this program element acceptable.

(5) Monitoring and Trending - The licensee's Alloy 600 Program uses the ASME Code Section XI inspection requirements for ISI and NRC staff accepted industry guidance. In general, the tools for monitoring and trending of nickel alloy component inspection programs are based on the scope and reporting requirements established by the ASME Code as required by 10 CFR 50.55a. The NRC staff notes that ASME Section XI requires, "recording of examination and test results that provide a basis for evaluation and facilitate comparison with the results of subsequent examinations." ASME Section XI also requires, "retention of all inspection, examination, test, and repair/replacement activity records and flaw evaluation calculations for the service lifetime of the component or system." ASME Section XI additionally provides rules for "additional examinations" (i.e., sample expansion), when flaws or relevant conditions are found that exceed the applicable acceptance criteria, to assist in determination of an extent of condition and causal analysis.

Specific monitoring or trending requirements may be created under NRC staff accepted industry guidance. Each of these programs for the detection of aging effects has been analyzed by the NRC to provide adequate detection capability. In addition for some of these programs, NRC temporary instructions for the NRC inspection of these industry programs have been developed, such as the case of Temporary Instruction 2525/172 which defines NRC inspection of licensee actions to complete the MRP-139 program noted within the scope of the licensee's Alloy 600 Program.

Based on this review, the NRC staff confirms that the "monitoring and trending" program element satisfies the guidance in SRP LR Section A.1.2.3.5. The NRC staff finds this program element acceptable.

(6) Acceptance Criteria - The licensee's Alloy 600 Program uses the ASME Code Section XI inspection requirements ISI and NRC staff accepted industry guidance. In general, the acceptance criteria of Alloy 600 component inspection programs are based on the scope and reporting requirements established by the ASME Code as required by 10 CFR 50.55a. The NRC staff notes that ASME Section XI, IWB-3000 contains acceptance criteria appropriate for the reactor coolant pressure boundary components examined in accordance with Section XI. Also, ASME Section XI, IWA-5250 was verified to contain acceptable steps for evaluation and corrective measures for sources of leakage identified by visual examinations for leakage. These requirements ensure that Alloy 600 components in the reactor coolant pressure boundary maintain their designed function under all required design conditions.

Additional specific acceptance criteria can be found in NRC staff accepted industry guidance. MRP-139 establishes acceptance criteria for the inspection of dissimilar metal butt welds fabricated with Alloy 600 weld materials. NRC Regulatory Information Summary 2008-025 states, in part, that the NRC staff believes that MRP-139 with certain considerations provides adequate protection of public health and safety for addressing PWSCC in butt welds for the near term pending incorporation by reference into 10 CFR 50.55a of an ASME Code Case containing comprehensive inspection requirements.

Based on this review, the NRC staff confirms that the "acceptance criteria" program element satisfies the guidance in SRP LR Section A.1.2.3.6. The NRC staff finds this program element acceptable.

(7) Corrective Actions - The licensee notes in Section 4.4 of the Alloy 600 Program several repair alternatives that address corrective actions to address PWSCC aging effects of nickel-based alloys. Specifically, the licensee's Alloy 600 Program uses the repair and replacement requirements of ASME Code Section XI for ISI and NRC staff accepted industry guidance. The NRC endorses the use of these repair and replacement activities through incorporation into the requirements of 10 CFR 50.55a.

The NRC staff notes that the reactor pressure vessel heads have been replaced with PWSCC resistant materials. The NRC staff finds this action demonstrates a proactive approach to corrective actions in addressing the aging effects of nickel-based alloys.

Based on this review, the NRC staff confirms that the "corrective actions" program element satisfies the guidance in SRP LR Section A.1.2.3.7. The NRC staff finds this program element acceptable.

(8) Confirmation Process – The confirmation process for the licensee's Alloy 600 Program uses the ASME Code Section XI inspection requirements for ISI and NRC staff accepted industry guidance. Reinspection of each alloy 600 component is specified through these programs. The reinspection frequency of these programs is adjusted based on flaw identification, repair technique, replacement, and mitigation. Through these reinspections the confirmation of reasonable assurance of structural integrity is verified for each component. Additionally, if any of these techniques fail to meet their acceptance criteria, additional corrective actions will be implemented by the licensee through its programs.

Based on this review, the NRC staff confirms that the "confirmation process" program element satisfies the guidance in SRP LR Section A.1.2.3.8. The NRC staff finds this program element acceptable.

(9) Administrative Controls - The administrative controls for the licensee's Alloy 600 Program uses the ASME Code Section XI inspection requirements for ISI and NRC staff accepted industry guidance. In addition, Section 3.0 of the licensee's Alloy 600 Program identifies responsibilities for this program and notes the Chief Nuclear Officer and Vice President, Nuclear Technical Services are ultimately responsible for the successful implementation of the Alloy 600 Program. Section 3.0 also includes administrative controls for preparation, maintenance and ownership of the program, ensuring compliance with regulatory requirements, participation in industry owner's groups meetings on Alloy 600 issues, conducting periodic self-assessments, documentation of Design Change Packages, and disposition of condition reports.

Based on this review, the NRC staff confirms that the "administrative controls" program element satisfies the guidance in SRP LR Section A.1.2.3.9. The NRC staff finds this program element acceptable.

(10) Operating Experience – Section 4.1 of the licensee's Alloy 600 Program provides industry experience regarding PWSCC and associated reactor coolant leakage incidents. Specifically, the licensee notes those components that have been replaced at PBNP.

As well in Attachment B of the Alloy 600 Program, the licensee provides its responses to numerous NRC communications since the early 1990s regarding Alloy 600 components. Further, in Section 3.1 of the Alloy 600 Program, the Programs Engineering Department is identified as being responsible for providing analysis and response to significant industry events and for serving as contact for outside technical communications including but not limited to NEI, INPO, NRC, EPRI, ASME, and Owners Groups.

Based on this review, the NRC staff confirms that the "operating experience" program element satisfies the guidance in SRP LR Section A.1.2.3.10. The NRC staff finds this program element acceptable.

5.0 CONCLUSION

The NRC staff has reviewed the licensee's Alloy 600 Program as a plant-specific program and finds that it meets the commitments made by the licensee and the requirements established in the SRP LR for structures and/or components made of nickel alloy material.

On the basis of its technical review of the licensee's Alloy 600 Program, the NRC staff concludes that the licensee has demonstrated that effects of aging will be adequately managed so that the intended functions will be maintained consistent with the current licensing basis for the period of extended operation, as required by 10 CFR 54.21(a)(3).

Principal Contributor: J. Collins, NRR

Date: October 6, 2009

Mr. Larry Meyer
Site Vice President
FPL Energy Point Beach, LLC
6610 Nuclear Road
Two Rivers, WI 54241

SUBJECT: POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2 – ALLOY 600 PROGRAM
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If you have any questions, please contact me at 301-415-2048.

Sincerely,

/RA/

Justin C. Poole, Project Manager
Plant Licensing Branch III-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-266 and 50-301

Enclosure:
Safety Evaluation

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J. Collins, NRR

Amendment Accession Number: ML092710593

*per memo dated August 5, 2009

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| NAME | JPoole | THarris | TChan* | PTam |
| DATE | 10/6/09 | 10/6/09 | 8/5/09 | 10/6/09 |

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